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JAN 28 1909
JOURNAL FRANKLIN INSTITUTE

TEST NO. 60.

Compliments of
Dr. A. Woolson

PRINTED REPORT NO. 9

REPORT
OF A
FIRE, LOAD and WATER TEST

MADE UPON A
TRIANGULAR REINFORCED CONCRETE
FLOOR SYSTEM

CONSTRUCTED BY
THE AMERICAN STEEL AND WIRE COMPANY

AT THE
FIRE TESTING STATION
COLUMBIA UNIVERSITY, NEW YORK CITY

TEST CONDUCTED BY
IRA H. WOOLSON, E. M.
Adjunct Professor of Civil Engineering

IN CO-OPERATION WITH
THE CITY BUILDING BUREAUS

NEW YORK
MARCH 5, 1908
PRICE 25 CENTS

The Columbia University Fire Testing Station is equipped with buildings suitable for testing floors, partitions, columns, doors, windows, and all varieties of building construction in full sized units. A complete laboratory equipment is available for making fire, and other physical tests upon small samples.

For further information, write to:

THE CITY BUILDING ENGINEER

NEW YORK

RECORD BUILDING

NEW YORK

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NOTE.

This test was made in strict accordance with the specifications of the New York City Building Bureau, and the installation of the partitions, as well as the test was at all times under the direct supervision of its Engineering Staff. The official approval of the system by the Superintendents of Buildings of all the various Boroughs, together with those of Philadelphia, Pa., and Providence, Rhode Island, are attached as an appendix to this report.

LETTER OF TRANSMITTAL.

COLUMBIA UNIVERSITY.

March 20, 1908.

MR. EDWARD S. MURPHY,

SUPERINTENDENT OF BUILDINGS,

BOROUGH OF MANHATTAN,

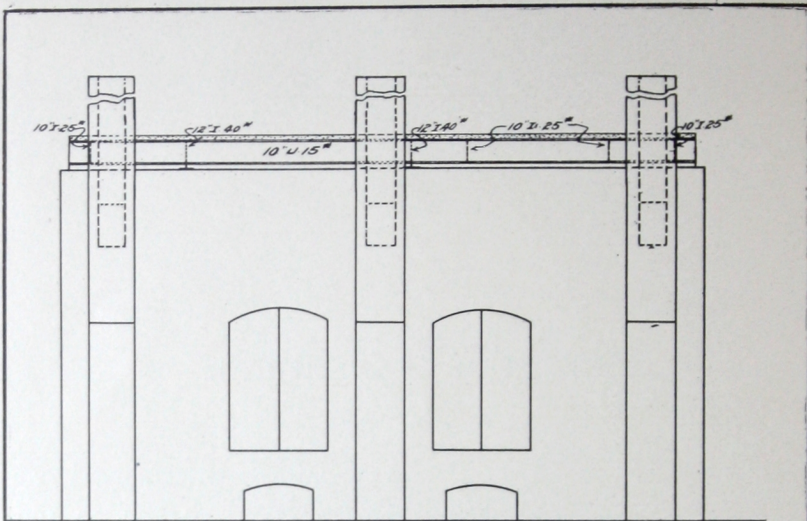
NEW YORK CITY.

Dear Sir:—I have the honor to submit the enclosed report of a Fire, Load and Water Test, made upon a reinforced concrete floor, March 6th, at the Fire Testing Station, Columbia University. The test was conducted under the supervision of the Engineering Staff from your Bureau, as well as that of other Boroughs. The Bureaus of Philadelphia and Providence also sent representatives to witness the test.

Yours very respectfully,

IRA H. WOOLSON,

10 28-39871 TLF

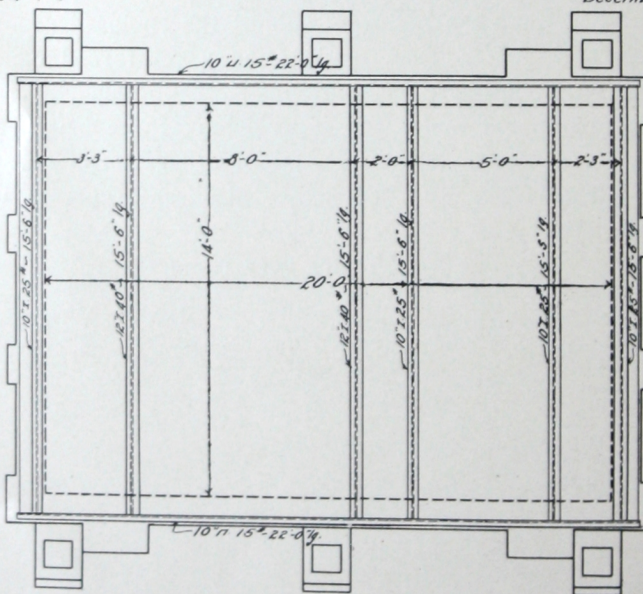


~ ELEVATION ~

AMERICAN STEEL & WIRE CO.
FIREPROOF FLOOR SYSTEM

Scale 1/4" = 1'-0"

December 3rd 1907



ROOF PLAN ~ TEST STRUCTURE ~

COLUMBIA UNIVERSITY TESTING STATION ~

~ Sheet No 1 ~

RUDOLPH P. MILLER
CONSULTING ENGINEER
321 FIFTH AVE. N.Y.C.

REPORT
OF A
FIRE, LOAD AND WATER TEST

MADE AT THE
FIRE TESTING STATION,
COLUMBIA UNIVERSITY, NEW YORK CITY

UPON A
TRIANGULAR REINFORCED CONCRETE
FLOOR SYSTEM

CONSTRUCTED BY THE
AMERICAN STEEL & WIRE COMPANY

TEST MADE MARCH 4, 1908

WEATHER OBSERVATIONS.

Day fair. Light West wind.
Temperature—35 to 37° F.

Test started, 8:30 A. M.
Water applied, 12:33 M.
Final loading, March 5, 1908.

METHOD OF CONSTRUCTION.

The test was conducted in test house No. 2, which is a reinforced cinder concrete structure 14' x 20' on the inside. It is supplied with six suitable chimneys at the top and draft openings thru the wall at the bottom. The fire grate is located 2'-6" above the ground level.

The floor construction under test formed the temporary roof of the test house. The under side or ceiling being 9'-6" above the grate.

Two types of floor arches were tested, one with a span of eight feet and the other a span of five feet.

The eight foot span occupied the south side of the test chamber and was made of cinder concrete five inches thick, reinforced with the metal fabric of the American Steel & Wire Company, known as Style No. 38. The disposition of which is indicated in the attached blueprints and photograph No. 1. This metal fabric consisted of three twisted strands of No. 4 steel wire, spaced and secured every four inches by No. 12½ diagonal steel cross wire.

The five foot span occupied the north side of the test chamber and was made of cinder concrete four inches thick, reinforced with American Steel & Wire Company's fabric, Style No. 23. The metal fabric in this span consisted of one strand of one-quarter inch steel wire, spaced and secured every four inches by diagonal wires the same as in the fabric of the eight foot span. The character of this fabric can be seen in the middle of photo. No. 1, where it laps over the two central beams. The fabric in the spans was placed 1½ inches above the bottom surface of the concrete.

The 8 ft. span was supported by 12"-40# I beams, and the five ft. span by 10"-25# I beams. These beams were protected by two inches of concrete below the bottom flange of the beams, and one and one-half inches of concrete at each side of the lower flanges.

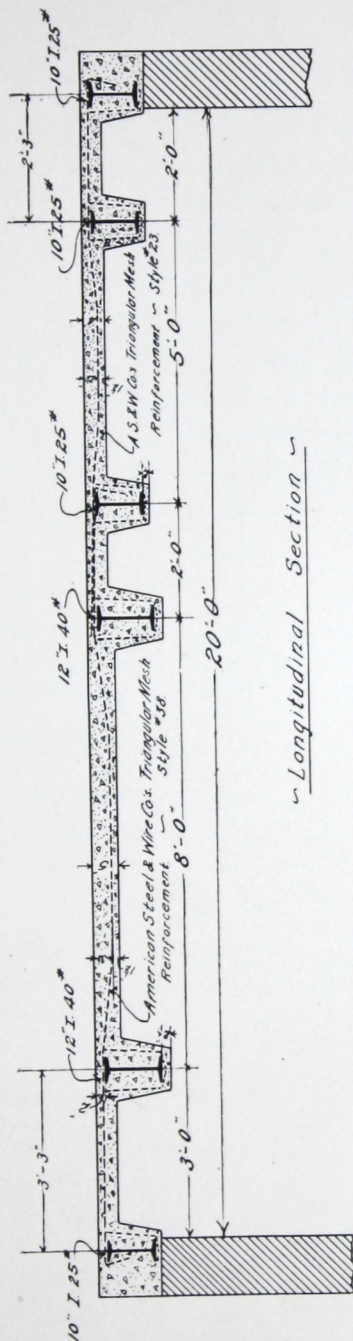
The concrete was held in place by American Steel & Wire Company's fabric, Style No. 8, consisting of one strand of No. 12½ wire secured in every four inches by No. 14 diagonal cross wires.

The concrete used in the construction was a 1-2-5 mixture of Portland cement, clean sharp sand, and boiler cinders.

Specimen blocks of this mixture were made at the time that the material was being placed, and were tested for strength when about eleven weeks' old. They gave an average value of 1000 lbs. per sq. inch.

Full details of the construction are given in the attached drawings and photographs.

The five ft. span was put in place Dec. 18, 1907, and the eight ft. span on Jan. 25, 1908. The former was therefore about eleven weeks old, and the latter six weeks at test.



Longitudinal Section

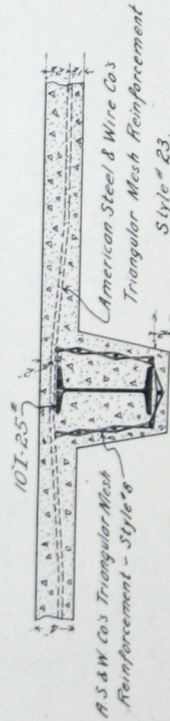
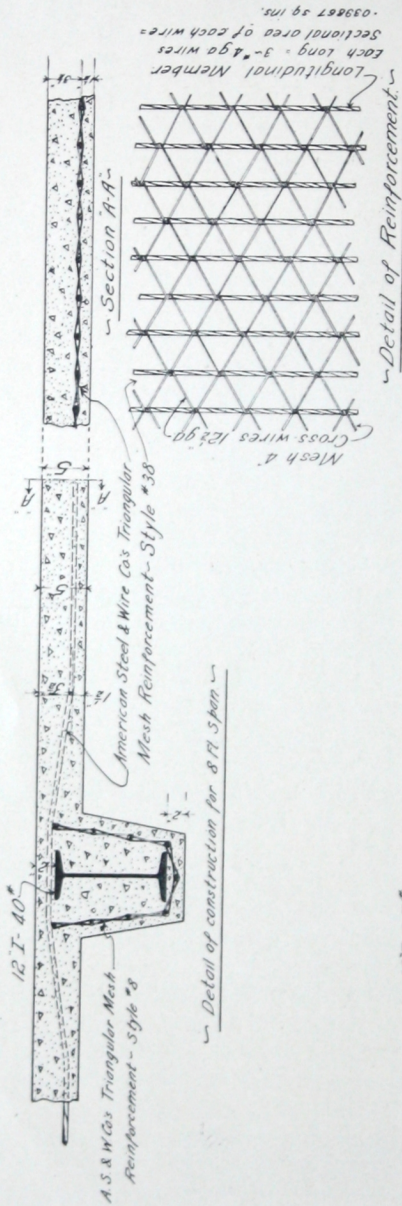
AMERICAN STEEL & WIRE CO.
FIREPROOF FLOOR SYSTEM

RUDOLPH P. MILLER
CONSULTING ENGINEER
325 FIFTH AVE., N.Y.C.

December 3rd 1907

Scale 1/2" = 1'-0"

Sheet No. 2.



Detail of construction for 5 ft span

AMERICAN STEEL & WIRE CO.
FIREPROOF FLOOR SYSTEM.

RUDOLPH P. MILLER
CONSULTING ENGINEER
SEVENTH AVE. NYC

DETAILS

Scale 1" = 1'-0"

December 3rd 1907

Sheet No. 3

Owing to the fact that it was stormy and freezing weather most of the period the concrete was setting, a salamander was kept burning in the test building the greater portion of the time.

PURPOSE OF THE TEST.

The purpose of the test was to determine the effect of a continuous fire below the floor for four hours at an average temperature of 1700° F., the floor carrying at the same time a distributed load of 150 lbs. per sq. ft.; at the end of the four hours the under side of the floor (or ceiling) while still red hot to be subjected to a 1½" stream of cold water at short range, thru 100' of hose under 60 lbs. pressure at the nozzle for five minutes, then the upper side of the floor (which forms the roof of the test building) to be flooded at low pressure; afterwards the stream to be again applied at full pressure on the under side for five minutes longer.

Deflection of beams and floor to be measured continuously during the test. The load then to be removed and after the floor becomes cold, it shall be reloaded to 600 lbs. per sq. ft. and deflections noted.

TEMPERATURES.

The temperatures of the fire were obtained by three electric pyrometer couples suspended thru the floor from above and hanging about 6" below the ceiling. The location of the couples is indicated on the temperature curve sheet.

Readings were made upon each couple every three minutes. The fuel used was dry cord wood, the frequency of firing being determined by the temperature of the test chamber. The "Log of Temperature Readings," together with plotted curve for the middle couple, is herewith attached.

DEFLECTIONS.

The deflections which occurred during the test were measured by a Y level, reading upon rods located upon the ends and middle of each beam, also upon the middle of the floor arches. The "Table of Deflections" gives full information regarding the variation in level of each point thruout the test, and the "Deflection Diagram" shows the relative position of the three members graphically at different times.

WATER.

The water was applied by firemen with an engine detailed from 143rd Street and 8th Avenue fire station, under direction of Battalion Chief Edward S. Root. The pressure gauge was carefully watched, and 60 lbs. maintained at the nozzle.

In applying the water, the stream was thrown back and forth over the whole ceiling as much as possible, and not allowed to strike continuously on one spot. After five minutes' application the pres-

sure was reduced to about 30 lbs. and the top of the floor flooded, then the stream was applied to the ceiling again at full pressure for five minutes longer. Total time of application at full pressure was 10 minutes.

Thru an error the firemen brought with them a $1\frac{1}{4}$ inch nozzle instead of the regulation $1\frac{1}{8}$ inch diameter. This larger nozzle was therefore used, which made the stream somewhat more severe than usual.

RESULTS OF THE TEST.

About one hour after starting the fire three cracks appeared on the top of the floor or roof of the building. Two of these cracks were parallel with and nearly over the two supporting beams of the eight foot span, and the third was similarly located along the middle beam of the five foot span. These cracks gradually opened during the test to a maximum width of about $\frac{3}{32}$ of an inch. Some water boiled out of the concrete and ran out upon the roof. During the latter part of the test, a few small diagonal cracks developed near the ends of the beams, and ran across the floor slabs towards the middle of the spans.

All of these cracks were evidently due to expansion. They appeared to be on the upper surface only. The underside of the floor or ceiling of the test chamber was in perfect condition so far as could be observed up to the application of water. The water scored the surface somewhat in front of the doors where its action was most severe, but only to a depth of about one inch as a maximum. Considerable of the concrete thus washed out was along the line of the cracks between the centering boards where the cement had evidently been carried away by the escaping water at the time the floor was placed. This is a defect that could be easily avoided.

The wire mesh encasing the bottom of the middle I beam of the eight foot span was exposed for about three feet near the middle of the beam, and the flange of the beam itself was bare for 18 inches. This was the only metal exposed by the application of water.

There was one crack four feet long in the central portion of the eight foot span about one foot from the middle beam and running parallel with it.

There were several small cracks across the bottom of the beams, but the concrete remained firm and secure.

As a whole the ceiling was in excellent condition at the completion of the test.

The maximum deflection at the middle of the eight and five foot span during the fire was $1\frac{1}{32}$ and $\frac{1}{16}$ inches, respectively. The larger part of this was recovered when the floor cooled, and the application of the final load of 600 lbs. per sq. foot increased the deflection on the larger span only $\frac{3}{16}$ inch, and on the smaller span, $\frac{1}{16}$ inch.

No new cracks developed as a result of the loading, and there was no evidence that the floor was distressed.

The total permanent deflection of the two spans after entire removal of load was $\frac{3}{8}$ inch for the 8 foot span and $\frac{1}{4}$ inch for the 5 foot span.

The test was conducted in co-operation with the Bureau of Buildings of this city, and the installation of the floor was observed by representatives from the Bureaus in the various Boroughs, also from Philadelphia.

The test was witnessed by the following Building Bureau Engineers:

A. Schwartz, Borough of Manhattan
H. Vanatta, Borough of Bronx
Harry Brown, Borough of Richmond
W. G. Button, Bureau of Building Inspection, Philadelphia. Pa.
Spencer B. Hopkins, Bureau of Buildings, Providence, R. I.

The American Steel & Wire Company were represented by:

T. H. Taylor, New York Office
H. S. Doyle, Chicago Office
L. A. Dietrich, New York Office
R. H. Pratt, New York Office and several others

A large number of spectators were present, among them were the following:

Rudolph P. Miller, Consulting Engineer, #527 5th Avenue, N. Y.
Col. Hodges, Chief Eng., Isthmian Canal Com., Washington, D. C.
R. Allworth, Assistant Chief Engineer, Washington, D. C.
Major Langfitt, U. S. Engineering Corps, Washington, D. C.
G. H. Stewart, Rep. "Ins. Engineer," #120 Liberty Street, N. Y.
G. E. Stecher, Rep. "Ins. Press," #56 Cedar Street, N. Y.
H. R. Leonard, Engineer, Penn. R. R., Philadelphia, Pa.
J. F. Murray, Engineer, Penn. R. R., Philadelphia, Pa.
B. H. Davis, Assist. Engineer, D. L. & W. R. R., Hoboken, N. J.
J. B. French, Engineer, L. I. R. R., Jamaica, L. I., N. Y.
R. W. How, Inspector, L. I. R. R., Jamaica, L. I., N. Y.
Geo. P. Enke, Inspector, German-American Insurance Co., N. Y.
Frank B. Gilbreth, Cont. Eng., #34 West 26th Street, N. Y.
P. H. Bevier, Engineer, National Fireproofing Co., N. Y.
S. P. Waldron, American Bridge Co., #42 Broadway, N. Y.
W. H. Olthoff, U. S. Steel Prod. Exp. Co., #24 State Street, N. Y.
J. Traverse, Neuchatel Asphalt Co., #265 Broadway, N. Y.
E. Merrick, Merrick Fireproof Co., #11 Broadway, N. Y.
P. E. Bertin, #30 West 33rd Street, N. Y. City
W. B. Ruggles, Curtin-Ruggles Co., #39 Cortlandt Street, N. Y.
L. R. Christie, Curtin-Ruggles Co., #39 Cortlandt Street, N. Y.
Capt. J. F. Shea, Jerome Avenue, and 183rd Street, N. Y.
Fuller Claflin, Architect, #1440 Broadway, N. Y. City
J. P. H. Perry, Turner Construction Co., #11 Broadway, N. Y.

C. U. Carpenter, Pres. Herring-Hall-Marvin Safe Co., #400
Broadway, N. Y. City

J. G. Ellendt, J. G. Ellendt Co., #1 Madison Avenue, N. Y. City

W. H. Wheelock, Douglass Robinson Co., #146 Broadway, N. Y.

G. E. Walsh, #555 West 183rd Street, N. Y. City

Respectfully submitted,

IRA H. WOOLSON.

DEFLECTION READINGS.

NOTE: For location of rods see "Deflection Diagrams." Deflections are given in sixteenths of an inch; those preceded by a minus sign are rises, those by no sign are falls.
Deflections read by J. C. Jenkins.

	1	2	3	4	5	6	7	8	9	10	11
March 3, 1908.											
No Load.											
10.00 a. m.	0	0	0	0	0	0	0	0	0	0	0
March 4.	Load, 150 lbs. per sq. ft.					Start of fire.					
8.30 a. m.	0	0	—1	0	0	1	0	0	0	0	0
50 "	0	2	—3	4	—2	2	0	3	—1	0	0
9.20 "	—1	3	—3	7	—3	2	—1	4	—2	2	—1
50 "	—1	3	—4	10	—3	2	—2	7	—2	3	—1
10.20 "	—1	4	—4	15	—3	6	—2	12	—2	4	—2
50 "	—2	7	—4	19	—3	9	—2	16	—3	8	—2
11.20 "	—2	10	—4	26	—3	14	0	21	—3	11	—3
50 "	—3	13	—5	30	—3	17	0	24	—3	13	—3
12.30 "	—3	15	—5	34	—3	20	0	28	—4	14	—4
End of fire.											
March 5.	Floor cool; load, 150 lbs. per sq. ft.										
8.45 a. m.	0	2	—2	8	0	2	0	7	0	3	0
		Load, 600 lbs. per sq. ft. on 5' span.									
1.30 p. m.	0	2	—2	7	—1	2	0	8	0	3	0
		Load, 600 lbs. per sq. ft. on 8' span.									
2.40 "	0	4	—1	13	0	4	1	7	2	3	2
		No load.									
4.30 "	0	0	0	6	—2	0	0	4	0	0	0

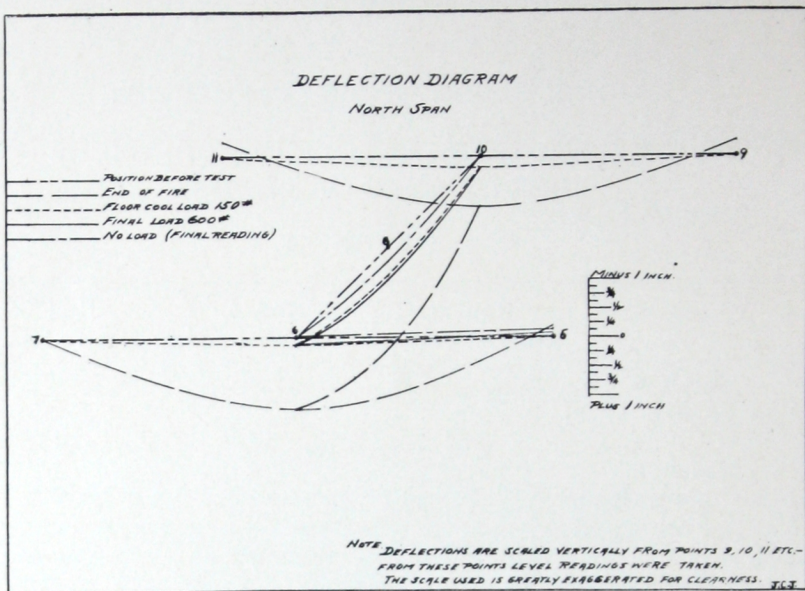
CORRECTED TOTAL DEFLECTIONS.
FOR MIDDLE OF BEAM, TAKING INTO ACCOUNT THE
RISE OF ENDS OF BEAMS.
8' SPAN.

	Rod 2. South Beam.	Rod 4. Centre Floor Slab.	Rod 6. Centre Beam.
March 4.			
End of fire, 12.30 p. m.	$1\frac{3}{16}"$	$1\frac{1}{32}"$	$1\frac{11}{32}"$
March 5.			
Floor cool; load, 150 lbs. per sq. ft.			
8.45 a. m.	$\frac{3}{16}"$	$\frac{3}{8}"$	$\frac{1}{8}"$
Load, 600 lbs. per sq. ft. 2.40 p. m.	$\frac{9}{32}"$	$\frac{9}{16}"$	$\frac{7}{32}"$
No load. 4.30 p. m.	0"	$\frac{3}{8}"$	$\frac{1}{16}"$

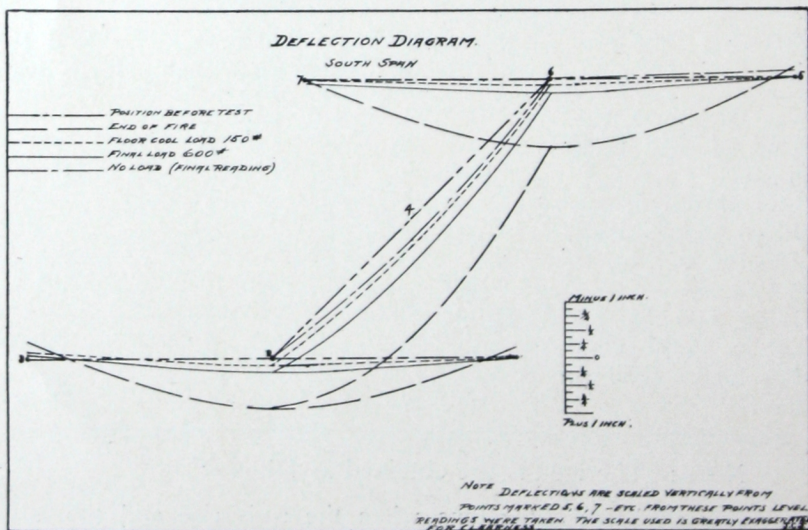
	5' SPAN.		
	Rod 6. Centre Beam.	Rod 8. Centre Floor Slab.	Rod 10. North Beam.
March 4.			
End of fire. 12.30 p. m.	$1\frac{11}{32}"$	$\frac{11}{16}"$	$1\frac{1}{8}"$
March 5.			
Floor cool; load, 150 lbs. per sq. ft.			
8.45 a. m.	$\frac{1}{8}"$	$\frac{9}{32}"$	$\frac{3}{16}"$
Load, 600 lbs. per sq. ft. 1.30 p. m.	$\frac{7}{32}"$	$\frac{11}{32}"$	$\frac{3}{16}"$
No load. 4.30 p. m.	$\frac{1}{16}"$	$\frac{1}{4}"$	0"

NOTE: The results are obtained as follows:

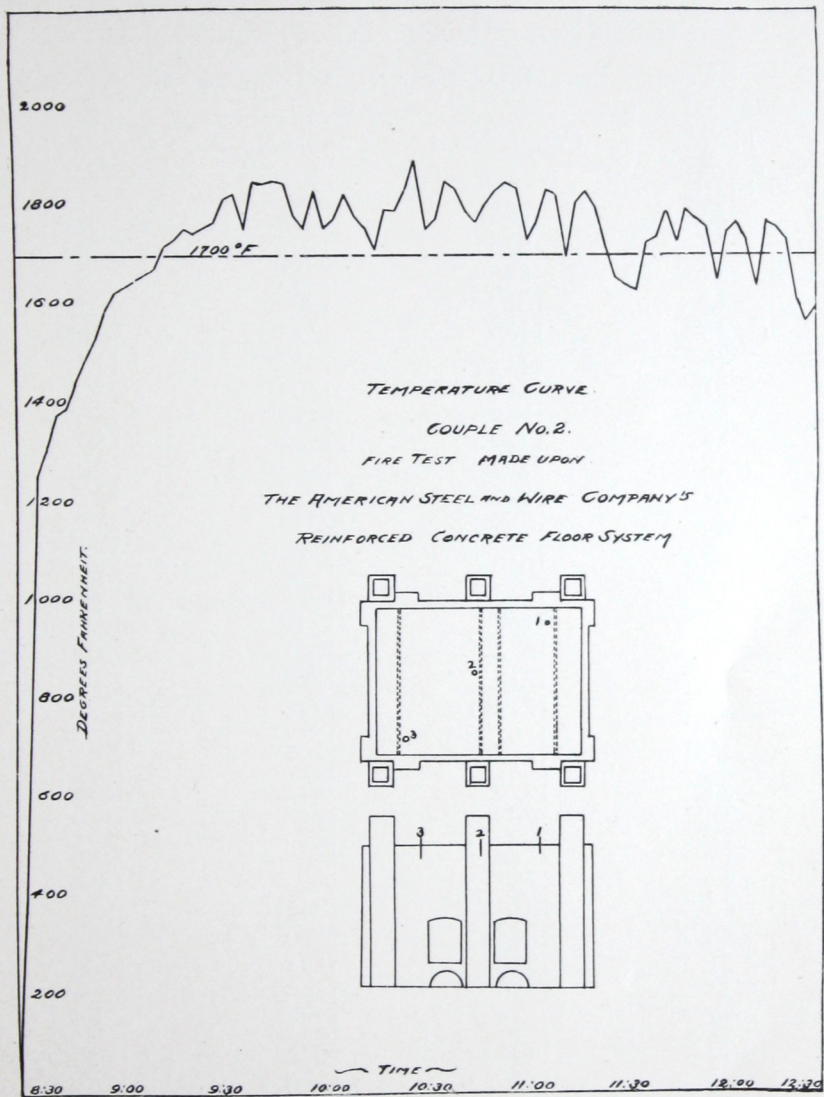
For all beam deflections when the ends rise and the middle falls, add the middle deflections to the mean of the two end rises. When the ends and middle fall, subtract.



DEFLECTION DIAGRAM FOR 5 FT. SPAN.



DEFLECTION DIAGRAM FOR 8 FT. SPAN.



LOG OF TEMPERATURE READINGS.

FIRE TEST.

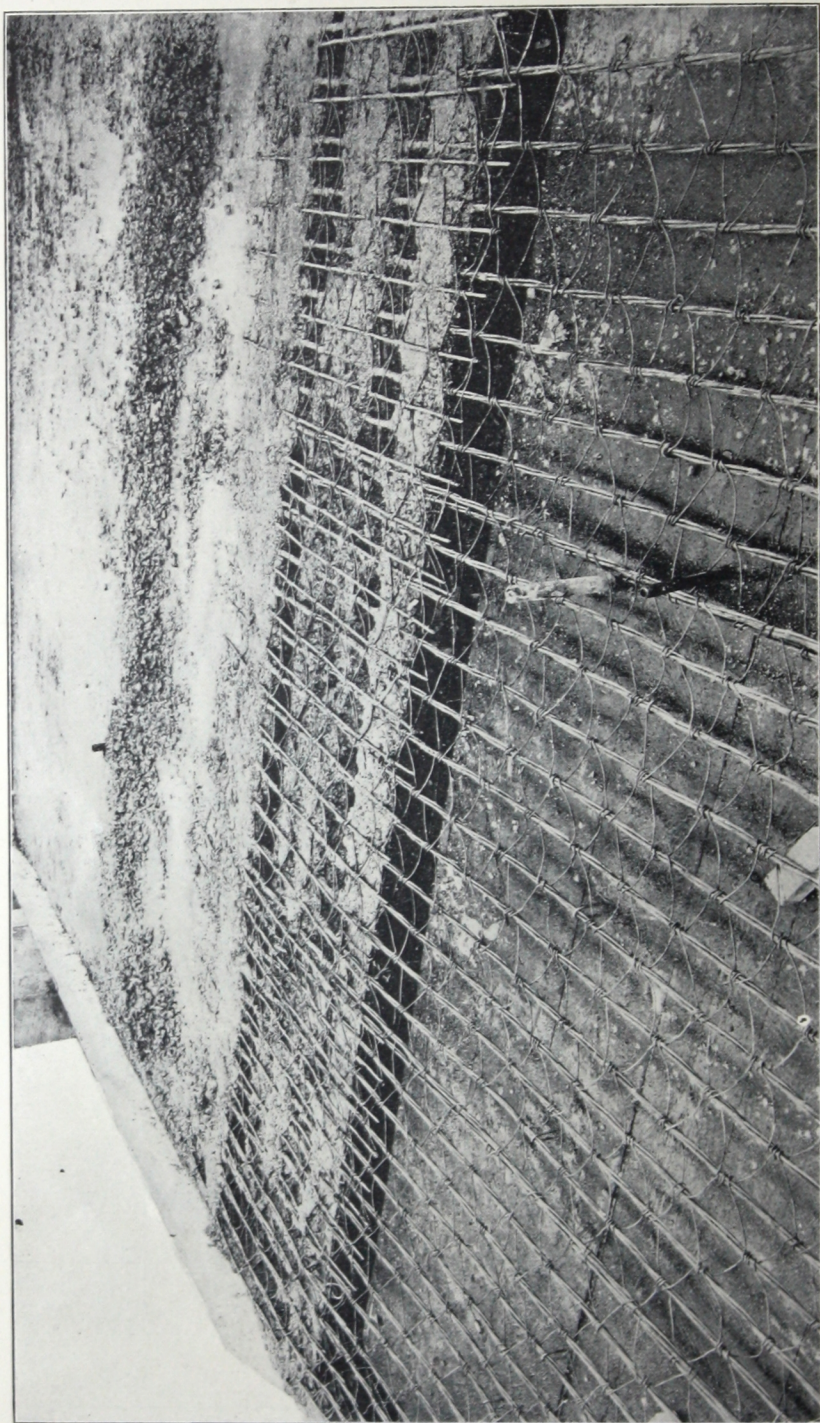
THE AMERICAN STEEL & WIRE COMPANY.

FIREPROOF FLOOR CONSTRUCTION.

Temperatures Read by J. S. MACGREGOR M. S.

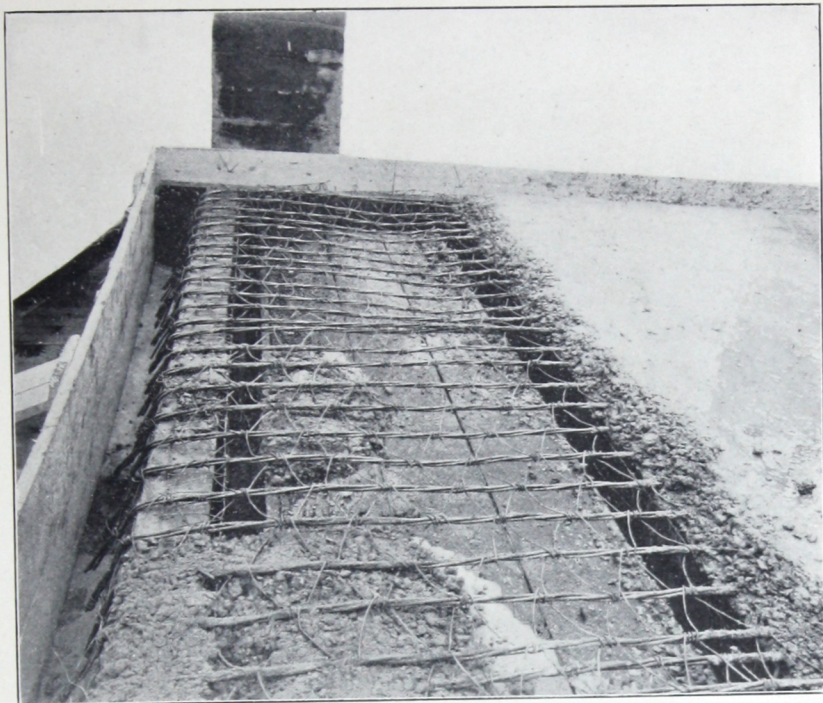
Time.	Couple No. 1.	Couple No. 2.	Couple No. 3
8.30 Start.			
33	205	394	261
36	815	1259	828
39	935	1311	1130
42	1019	1380	1254
45	1156	1397	1311
48	1248	1457	1324
51	1346	1494	1374
54	1385	1530	1415
57	1447	1586	1397
9.00	1524	1622	1415
03	1562	1635	1426
06	1584	1647	1462
09	1610	1659	1499
12	1635	1671	1545
15	1659	1719	1562
18	1647	1731	1573
21	1719	1755	1597
24	1719	1743	1586
27	1707	1755	1622
30	1719	1767	1635
33	1779	1814	1659
36	1802	1825	1719
39	1732	1756	1708
42	1768	1850	1768
45	1838	1844	1774
48	1844	1850	1792
51	1780	1844	1768
9.54	1720	1780	1708
57	1732	1756	1690
10.00	1804	1827	1756
03	1744	1756	1732
06	1756	1774	1744
09	1780	1821	1804
12	1768	1780	1756
15	1732	1738	1696
18	1684	1708	1732

Time.	Couple No. 1.	Couple No. 2.	Couple No. 3.
21	1756	1792	1744
24	1741	1789	1717
27	1836	1830	1765
30	1857	1895	1765
33	1707	1753	1693
36	1765	1777	1717
39	1847	1853	1824
42	1830	1836	1813
45	1753	1789	1741
48	1741	1765	1729
51	1847	1801	1777
54	1819	1830	1824
57	1836	1847	1830
11.00	1824	1836	1813
03	1705	1729	1671
06	1777	1765	1729
09	1789	1836	1777
12	1777	1824	1789
15	1705	1693	1771
18	1795	1807	1747
21	1819	1830	1783
24	1771	1795	1771
27	1687	1711	1650
11.30	1638	1650	1625
33	1640	1638	1644
36	1640	1625	1644
39	1687	1723	1675
42	1711	1735	1717
45	1759	1795	1771
48	1675	1723	1675
51	1771	1795	1723
54	1747	1771	1723
57	1759	1759	1711
12.00	1612	1648	1601
03	1745	1743	1687
06	1757	1769	1745
09	1721	1732	1697
12	1600	1635	1622
15	1757	1769	1757
18	1740	1758	1734
21	1704	1728	1692
24	1618	1607	1579
27	1629	1562	1593
30	1608	1593	1580
Averages	1655	1704	1644



ARRANGEMENT OF METAL IN THE FLOOR.

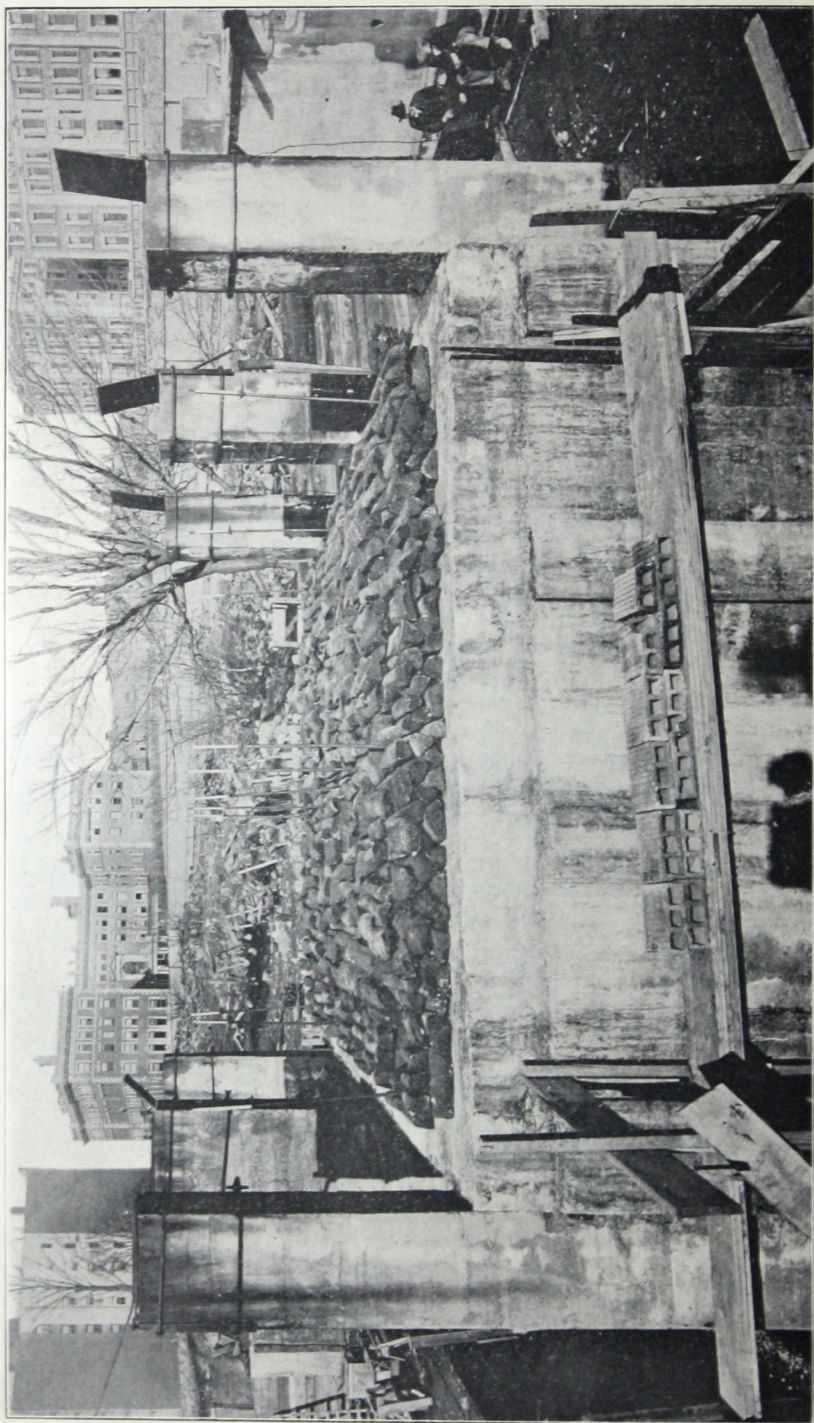
Concrete partially in place on the 5 ft. span. 8 ft. span in the foreground.



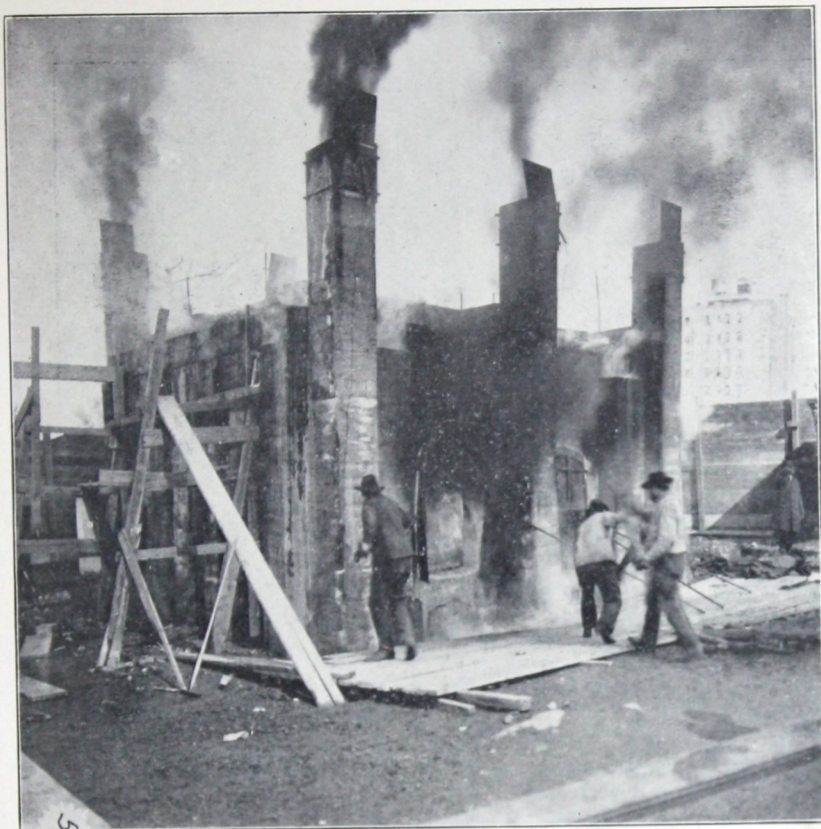
METHOD OF ANCHORING METAL AT EDGE OF FLOOR.
Concrete in place on 8 ft. span.



Underside of Floor before Test, showing two Middle Beams, and 8 ft. span.



Load of 150 lbs. per sq. foot carried by Floor During Fire.



Building During the Fire.

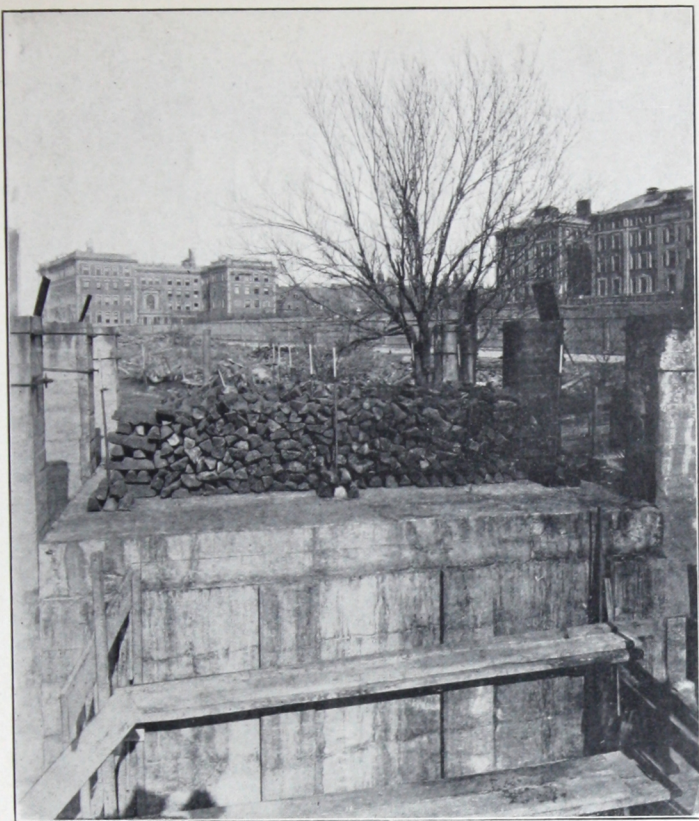


Firemen Applying Water.



UNDERSIDE OF FLOOR AFTER TEST.

Condition of 8 ft. span shown at top of picture. Beams in the middle, and 5 ft. span beyond.



Load of 600 lbs. per sq. ft. on 8 ft. span.



Load of 600 lbs. per sq. ft. on 5 ft. span.

APPENDIX

THE FOLLOWING ARE COPIES OF THE OFFICIAL APPROVALS OF THIS CONSTRUCTION GRANTED BY THE SUPERINTENDENTS OF BUILDINGS IN THE VARIOUS BOROUGHS OF NEW YORK CITY, ALSO FROM PHILADELPHIA, PA., AND PROVIDENCE, R. I.

THE BUREAU OF BUILDINGS
FOR THE BOROUGH OF MANHATTAN
220 FOURTH AVENUE
S. W. CORNER 18TH ST.

EDWARD S. MURPHY
SUPERINTENDENT

BY

NEW YORK April 10, 1908.

American Steel and Wire Co.,

Chicago, Ill.

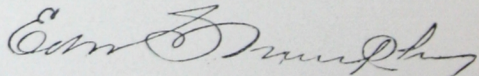
Gentlemen:-

As a result of the fire and water test on March 4th and 5th, 1908, at Columbia University, under the supervision of this Bureau, your form of fireproof floor construction is hereby approved for general use in the Borough of Manhattan, as a fireproof construction when constructed as tested.

In case the materials and workmanship in actual practice fall below the standard established in the test construction, this permit will be at once suspended or revoked.

This approval is granted on the further condition that this system will be installed by you only.

Yours truly,



Superintendent.



MTD/PAF
BUREAU OF BUILDINGS
DAVID F. MOORE, SUPERINTENDENT
JOHN R. ANDERSON, ASSISTANT SUPERINTENDENT

The City of New York
Office of the
President of the Borough of Brooklyn

Borough Hall
Brooklyn March 26th, 1908.

American Steel & Wire Co.,

Mr. R. P. Miller, C.E.,

527 Fifth Avenue, N. Y.

Dear Sir:-

I am in receipt of your favor of the 24th inst., together with report of Prof. Ira H. Woolson, on the fire, water and load test made on your floor construction March 4th, 1908, and in reply to same would say that this system of reinforced concrete floor construction will be acceptable to this Bureau, providing it is designed and put in place in accordance with the Rules and Regulations governing such construction in this Borough.

Yours very truly,

David F. Moore

Superintendent of Buildings,
Borough of Brooklyn.

Patrick J. Reville
Superintendent

City of New York
Office of
The Superintendent of Buildings
Borough of the Bronx
177th Street and Third Avenue

New York, March 25, 1908.

American Steel & Wire Co.,
#527 Fifth Avenue, N. Y. City.

Gentlemen:-

As a result of the fire, load and water test on March 4th, 1908, at the Columbia University, Department of Mechanical Engineering, your form of reinforced concrete floor construction is hereby approved for general use in the Borough of the Bronx, as a fireproof construction when constructed as follows:

The concrete-steel construction shall be designed and made in accordance with the rules and regulations of this Bureau regarding concrete-steel construction, as adopted April 3rd, 1905;

The strength of the construction shall be determined in accordance with these rules and regulations;

All the steel used in the construction shall be surrounded on all sides with at least one and one-half inch of concrete in the floor slab, and at least two inches in the beams, girders and columns.

The cinder concrete construction is approved as a

Patrick J. Reville
Superintendent

City of New York
Office of
The Superintendent of Buildings
FOR THE Borough of the Bronx
177th Street and Third Avenue

American Steel & Wire Co.,
March 25th/08,

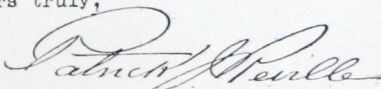
p.2.

fireproof floor construction for spans up to 8'-0" and loads not exceeding 150 pounds per square foot providing that the construction is in all cases as tested.

In case the materials and workmanship in actual practice fall below the standard established in the test construction, this permit will be at once suspended or revoked.

This approval is granted on the further consideration that you will be responsible for the proper installation of this construction, and that this system will be installed by you or your accepted representative.

Yours truly,


Superintendent of Buildings,
Borough of the Bronx.

BUREAU OF BUILDINGS,

**BOROUGH OF RICHMOND.
NEW BRIGHTON.**

JOHN SEATON,
SUPERINTENDENT.

New York City, April 10, 1908.

The American Steel & Wire Company,
c/o Rudolph P. Miller, Esq.,
527 Fifth Avenue, New York.

Gentlemen:-

Mr. Rudolph P. Miller's letter of March 24th requesting the approval of this Bureau of the fire, load and water tests made upon a triangular reinforced concrete fireproof floor system constructed by your Company, held at the Columbia University on March 4th, 1908, together with specifications, blueprints and photographs showing the construction of same, is received.

The representative from this Bureau who was present at the tests reports that the same were successful, and I hereby approve of the use of said fireproof construction in this Borough. You are granted this approval, however, with the distinct understanding that all work should be done strictly in accordance with the plans and specifications mailed by you to this Bureau, and that your Company will be responsible for the proper installation of the same.

Yours very truly,

John Seaton
Superintendent of Buildings,
Borough of Richmond.

TELEPHONE 1900 GREENPOINT.

BUREAU OF BUILDINGS,

BOROUGH OF QUEENS.

HACKETT BUILDING.

LONG ISLAND CITY.

CARL BERGER
SUPERINTENDENT.

April 10th, 1908. 190

American Steel & Wire Co.,
#527-5th Ave., N.Y.City.

Gentlemen:-

In answer to your favor of the 24th inst. asking for the approval of this Department of the American Steel and Wire Company's floor construction, as tested by Prof. Ira Woolson, would say, as a result of the fire, water and load test, as per copy of Prof. Woolson's report received, this Department will approve of the said floor construction.

Respectfully yours,

Carl Berger.
Superintendent..

Department of Public Safety
Bureau of Building Inspection

Henry Clay Director
Edwin Clark Chief of Bureau

Rooms 313-315-317-319,

City Hall,

Philadelphia, April 13, 1908.

SUBJECT:- Floor system.

American Steel & Wire Company,

Care Rudolph P. Miller,

527 Fifth Avenue, New York.

Gentlemen:-

We hereby approve for use in the City of Philadelphia the Triangular Reinforced Concrete Floor System constructed by the American Steel & Wire Company, of Chicago, Ill., upon the condition that it complies with all the Rules and Regulations of the City of Philadelphia.

Yours truly,

Edwin Clark
Chief.

OFFICE OF
INSPECTOR OF BUILDINGS,
CITY HALL.

Providence, R. I. March 30th, 1908.

To the American Steel and Wire Company:

Gentlemen:-

I had the pleasure of witnessing the fire, water and load test on the 4th inst, as applied to your method of wire woven reinforcement for concrete construction, and I can freely say that although the tests were of a very severe nature, yet in each case the reinforcement more than met the expectations. I certainly should be glad to give it my indorsement for use in this city or vicinity.

Truly yours,

Spencer B. Hopkins

Inspector of Buildings.

EVENING TIMES PRESS
ELIZABETH, N. J.

